

AUTOMOTIVE GRADE

ROHS

GREEN

(5-2008)3

High Speed Infrared Emitting Diodes, 940 nm, GaAlAs, DH



DESCRIPTION

VSMB2000X01 series are infrared, 940 nm emitting diodes in GaAlAs (DH) technology with high radiant power and high speed, molded in clear, untinted plastic packages (with lens) for surface mounting (SMD).

APPLICATIONS

- IrDA compatible data transmission
- · Miniature light barrier
- Photointerrupters
- Optical switch
- · Control and drive circuits
- · Shaft encoders

FEATURES

- Package type: surface mount
- Package form: GW, RGW
- Dimensions (L x W x H in mm): 2.3 x 2.3 x 2.8
- AEC-Q101 qualified
- Peak wavelength: λ_p = 940 nm
- · High reliability
- · High radiant power
- High radiant intensity
- Angle of half intensity: $\phi = \pm 12^{\circ}$
- Low forward voltage
- · Suitable for high pulse current operation
- Terminal configurations: gullwing or reserve gullwing
- Package matches with detector VEMD2000X01 series
- Floor life: 4 weeks, MSL 2a, acc. J-STD-020
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC

Note

** Please see document "Vishay Material Category Policy": www.vishay.com/doc?99902

PRODUCT SUMMARY					
COMPONENT	I _e (mW/sr)	φ (deg)	λ _P (nm)	t _r (ns)	
VSMB2000X01	40	± 12	940	15	
VSMB2020X01	40	± 12	940	15	

Note

Test conditions see table "Basic Characteristics"

ORDERING INFORMATION				
ORDERING CODE	PACKAGING	REMARKS	PACKAGE FORM	
VSMB2000X01	Tape and reel	MOQ: 6000 pcs, 6000 pcs/reel	Reverse gullwing	
VSMB2020X01	Tape and reel	MOQ: 6000 pcs, 6000 pcs/reel	Gullwing	

Note

· MOQ: minimum order quantity

ABSOLUTE MAXIMUM RATINGS (T _{amb} = 25 °C, unless otherwise specified)				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Reverse voltage		V_{R}	5	V
Forward current		I _F	100	mA
Peak forward current	$t_p/T = 0.5, t_p = 100 \mu s$	I _{FM}	200	mA
Surge forward current	t _p = 100 μs	I _{FSM}	1	А
Power dissipation		P _V	160	mW
Junction temperature		T _j	100	°C
Operating temperature range		T _{amb}	- 40 to + 85	°C
Storage temperature range		T _{stg}	- 40 to + 100	°C
Soldering temperature	t ≤ 5 s	T _{sd}	260	°C
Thermal resistance junction/ambient	J-STD-051, leads 7 mm, soldered on PCB	R _{thJA}	250	K/W

Rev. 1.5, 23-Aug-11 Document Number: 81930

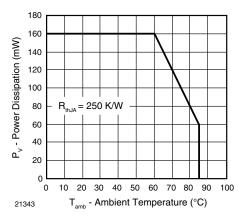


Fig. 1 - Power Dissipation Limit vs. Ambient Temperature

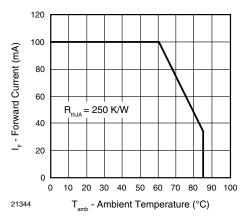


Fig. 2 - Forward Current Limit vs. Ambient Temperature

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
TANAMETEN	$I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$	V _F	1.15	1.35	1.6	V
Forward voltage	$I_F = 1 \text{ A}, t_p = 100 \mu\text{s}$	V _F	1.10	2.2	1.0	V
	I _F = 1 mA	TK _{VF}		- 1.8		mV/K
Temperature coefficient of V _F	I _F = 100 mA	TK _{VF}		- 1.1		mV/K
Reverse current	V _R = 5 V	I _R			10	μA
Junction capacitance	$V_R = 0 \text{ V, } f = 1 \text{ MHz, } E = 0 \text{ mW/cm}^2$	CJ		70		pF
Radiant intensity	$I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$	l _e	20	40	60	mW/sr
	I _F = 1 A, t _p = 100 μs	l _e		330		mW/sr
Radiant power	$I_F = 100 \text{ mA}, t_p = 20 \text{ ms}$	φ _e		40		mW
Temperature coefficient of radiant	I _F = 1 mA	TKφ _e		- 1.1		%/K
power	I _F = 100 mA	TKφ _e		- 0.51		%/K
Angle of half intensity		φ		± 12		deg
Peak wavelength	I _F = 30 mA	λ_{p}	920	940	960	nm
Spectral bandwidth	I _F = 30 mA	Δλ		25		nm
Temperature coefficient of λ_p	I _F = 30 mA	$TK\lambda_p$		0.25		nm/K
Rise time	I _F = 100 mA, 20 % to 80 %	t _r		15		ns
Fall time	I _F = 100 mA, 20 % to 80 %	t _f		15		ns
Cut-off frequency	I _{DC} = 70 mA, I _{AC} = 30 mA pp	f _c		23		MHz
Virtual source diameter		d		1.5		mm

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

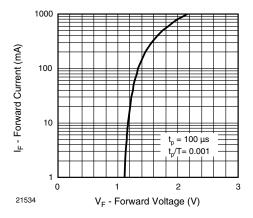


Fig. 3 - Forward Current vs. Forward Voltage

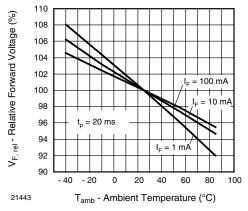


Fig. 4 - Relative Forward Voltage vs. Ambient Temperature

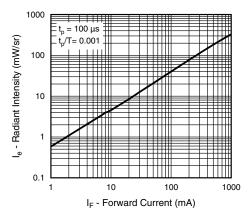


Fig. 5 - Radiant Intensity vs. Forward Current

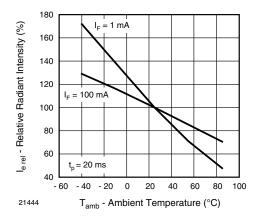


Fig. 6 - Relative Radiant Intensity vs. Ambient Temperature

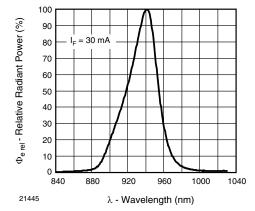


Fig. 7 - Relative Radiant Power vs. Wavelength

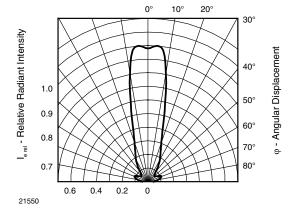


Fig. 8 - Relative Radiant Intensity vs. Angular Displacement

SOLDER PROFILE

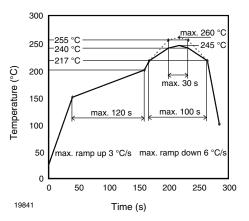


Fig. 9 - Lead (Pb)-free Reflow Solder Profile acc. J-STD-020

DRYPACK

Devices are packed in moisture barrier bags (MBB) to prevent the products from moisture absorption during transportation and storage. Each bag contains a desiccant.

FLOOR LIFE

Floor life (time between soldering and removing from MBB) must not exceed the time indicated on MBB label:

Floor life: 4 weeks

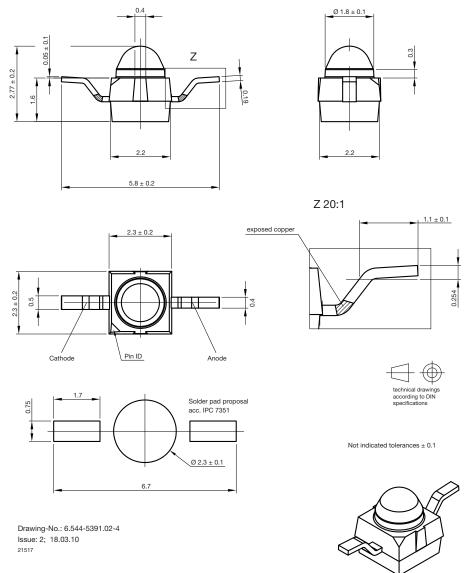
Conditions: T_{amb} < 30 °C, RH < 60 %

Moisture sensitivity level 2a, acc. to J-STD-020.

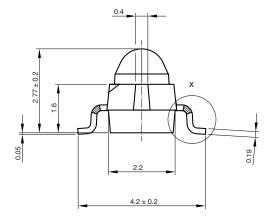
DRYING

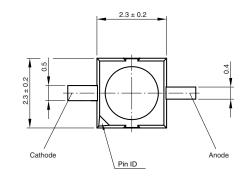
In case of moisture absorption devices should be baked before soldering. Conditions see J-STD-020 or label. Devices taped on reel dry using recommended conditions 192 h at 40 $^{\circ}$ C (+ 5 $^{\circ}$ C), RH < 5 $^{\circ}$ M.

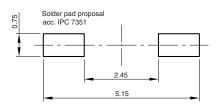
PACKAGE DIMENSIONS in millimeters: **VSMB2000**



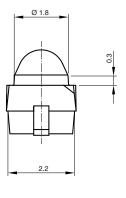
PACKAGE DIMENSIONS in millimeters: **VSMB2020**

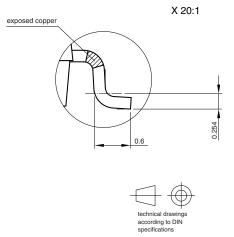




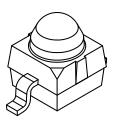


Drawing-No.: 6.544-5383.02-4 Issue: 4; 18.03.10 ²¹⁴⁸⁸

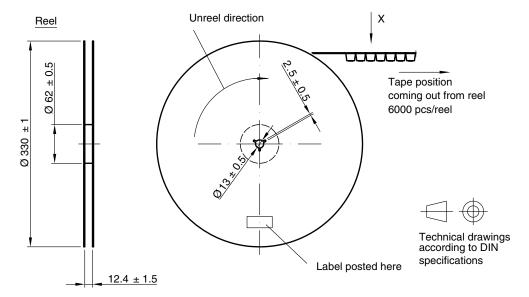




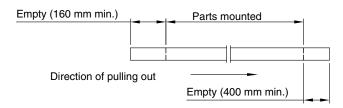
Not indicated tolerances ± 0.1



TAPING AND REEL DIMENSIONS in millimeters: VSMB2000

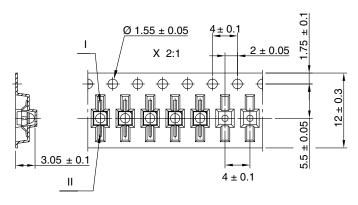


Leader and trailer tape:



Terminal position in tape

Devicce	Lead I	Lead II
VEMT2000		
VEMT2500	Collector	Emitter
VEMD2000		
VEMD2500	Cathode	Anode
VSMB2000	Calliode	Arioue
VSMG2000		
VSMY2850RG	Anode	Cathode

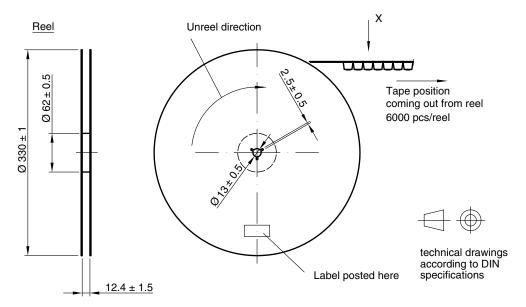


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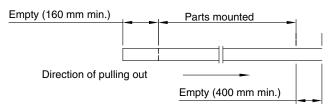
Issue: 2; 18.03.10

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TAPING AND REEL DIMENSIONS in millimeters: VSMB2020

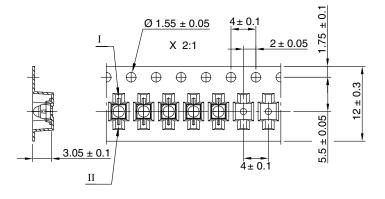


Leader and trailer tape:



Terminal position in tape

Devicce	Lead I	Lead II
VEMT2020		
VEMT2520	Collector	Emitter
VSMB2020		
VSMG2020	0-44-	Al -
VEMD2020	Cathode	Anode
VEMD2520		
VSMY2850G	Anode	Cathode



Drawing-No.: 9.800-5091.01-4

Issue: 3; 18.03.10

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